

## **REMARKS**

This paper is in response to the Office Action dated October 30, 2009. Applicant has amended the application as set forth above. No new matter is added by the amendments as discussed below. Upon entry of the amendments, Claims 1, 5-8 and 10-15 are pending in this application. Applicant respectfully requests the entry of the amendments and reconsideration of the application in view of the above amendments and the following remarks.

### **Discussion of Amendments**

The amendments to Claim 1 are to rephrase some limitations and delete unnecessary language. No new matter has been added.

Support for new Claim 15 can be found in the original application, including, for example, Claim 1, and Figures 4-6 and their attendant description in the specification. No new matter has been added.

### **Discussion of Claim Objection**

The Office Action objected to limitations of Claim 1 and provided suggestions. In response, Applicant has amended Claim 1 as suggested by the Office Action.

### **Discussion of Rejection Under 35 U.S.C. § 103**

The Office Action rejected Claims 1, 5-8, 10-14 under 35 U.S.C. § 103 (a) as being unpatentable over Hayashi (U.S. Patent Application No. 2004/0021566 A1) in view of Leszczynski (U.S. Patent No. 5,157,639). Applicant respectfully disagrees with the Examiner, as discussed below.

#### **Disclosure of Hayashi**

**Hayashi** discloses a system that determines location of an item or person by determining the location of a transmitting station attached to the item or person. In Hayashi's system, a transmitting station periodically transmits an ID signal containing an identifier, and a receiving station receives the ID signal. Then, the receiving station measures *the intensity* of the ID signal, and reads the identifier. See Hayashi at ¶ 0024. A data management unit stores and manages *the intensity* in association with the identifier that is supplied from the receiving station. *Id.* A

positioning computer estimates the location of the transmitting station using the data stored in the data management unit. *Id.* Here, Hayashi uses *the intensity* of the ID signal to determine the position of the transmitting station, which includes *determining a distance* between the transmitting and receiving stations. *See id.* at ¶¶ 0025-0029, 0043-0045, 0094, 0101, 0104-0106, and 0168-0170. For the Examiner's convenience, paragraph 0101 of Hayashi is reproduced below.

[0101] The positioning computer 11 *determines a first correcting formula defining a relation between intensity and distance in order to accurately estimate the position of either a transmitting station or a receiving station* under the indoors environment. As has been described above, the intensity  $e_{ij}$  of a received signal is actually measured at a receiving station under the indoors propagation condition. The positioning computer 11 determines the relation between the intensity  $e_{ij}$  and the distance  $d_{ij}$  from the transmitting station 21 to the receiving station 31 using the actually measured values. The first correcting formula is a corrected Friis' formula using correcting coefficients including environmental coefficients. Since the distance, and therefore, the positional coordinates of a transmitting station are estimated based on the actually measured value taking the correcting factors into account, the positioning accuracy is improved even indoors.

#### Disclosure of Leszczynski

**Leszczynski** teaches ultrasonic detectors that are used to determine the level of liquid contained in a tank or the magnitude of flow within a conduit. *See Leszczynski*, Col. 1, lines 5-8. Leszczynski's ultrasonic detectors emit bursts of ultrasonic energy and respond to echoes of the bursts that are reflected from surfaces of the tank or conduit. *See id.* at Col. 1, lines 10-15. Leszczynski also teaches determining the time of arrival of echoes using the first received echo or the echo having the largest magnitude. *See id.* at Col. 4, lines 13-18. Leszczynski further teaches distinguishing true echoes from spurious echoes based on the frequency of the echo signal. *See id.* at Col. 8, line 60-Col. 9, line 5.

#### Claim 1

Claim 1 is directed to a method of determining a distance between objects. Claim 1 recites "transmitting, from a transmitter, an ultrasonic signal having a specific frequency component maintained for a predetermined period; receiving the ultrasonic signal at a receiver located at a distance from the transmitter; amplifying the received ultrasonic signal to generate an amplified signal; filtering the amplified signal to generate a filtered signal in which an unnecessary frequency component of the amplified signal is removed or weakened; converting the filtered signal into a digital signal." Claim 1 further recites "extracting a portion of the

converted digital signal that reflects the specific frequency component maintained for the predetermined period; analyzing the extracted portion to determine an arrival time of the ultrasonic signal; and determining the distance between the transmitter and the receiver, using the arrival time.”

Discussion of the Office Action’s Comments

The Office Action asserts at page 3, lines 10-12 that “Hayashi teaches transmitting an ultrasonic signal having a specific frequency from a location where a distance from the object will be measured, to the first and second receivers (page 11, ¶¶ 0172-0173) and the ultrasonic signal having a specific frequency component maintained for a predetermined period (page 9, ¶¶ 0140 and 0144).” For the Examiner’s convenience and reference, Paragraphs 0140 and 0144 of Hayashi the Examiner referred to in the Office Action are reproduced below.

[0140] Preferably, the transmitting station 21 has a function of setting a long oscillation period, regardless of the ON/OFF operation of the sensor 26 for the purpose of effective control of the position of the transmitting station 21. The oscillation period does not have to be perfectly constant. By randomly varying the oscillation period with a width of several percents of the period, signal being transmitted simultaneously from different stations can be avoided.

[0144] (B) The transmitting station also transmits a type-b ID signal in a periodic manner every predetermined time interval (S204 and S205).

In the foregoing paragraphs, Hayashi teaches neither “transmitting an ultrasonic signal having a specific frequency component maintained for a predetermined period” nor “extracting a portion of the converted digital signal that reflects the specific frequency component maintained for the predetermined period.” At best, Hayashi teaches transmitting an ID signal in a periodic manner every predetermined time interval.

The Office Action further asserts at page 3, lines 14-16 that “Hayashi teaches extracting specific frequencies of the ultrasonic received from the first and second receivers to find an arrival time of a first signal and converting the time into a distance (page 11, ¶¶ 0168-0169)” Paragraphs 0168 and 0169 of Hayashi are reproduced below.

[0168] The receiving station 31 measures the intensity of the ID signal carried by ultrasonic waves, reads the identifier, and supplies the measured intensity and the identifier to the server 12. The positioning computer 11 determines a first correcting formula defining a relation between propagation characteristics of ultrasonic wave (i.e., intensity) and distance, and estimates the position of an unknown transmitting station using the determined formula according to the algorithm shown in FIG. 14. The algorithm shown in FIG. 14 is equally applicable to signals carried by electromagnetic waves and ultrasonic waves.

[0169] Accordingly, when a signal is transmitted from an  $i^{\text{th}}$  transmitting station at  $(x_i, y_i)$  via ultrasonic waves and received at a  $j^{\text{th}}$  receiving station at  $(u_j, v_j)$ , the intensity  $e_{ij}$  of the ultrasonic signal is measured at the  $j^{\text{th}}$  receiving station. The distance between the  $i^{\text{th}}$  transmitting station and the  $j^{\text{th}}$  receiving station is expressed by Equation (1).

$$d_{ij} = \sqrt{(x_i - u_j)^2 + (y_i - v_j)^2} \quad (1)$$

In these paragraphs, Hayashi still fails to teach “extracting a portion of the converted digital signal that reflects the specific frequency component maintained for the predetermined period.” Applicant notes that Hayashi measures an ID signal, particularly the intensity of ID signal to determine a distance. However, Hayashi provides no teaching about extracting a portion of signal that reflects a specific frequency component that is maintained for a predetermined period.

The Office Action also asserts at page 4, lines 1-3 that “Leszczynski teaches the signal processing as explained in the rejection above.” While Leszczynski teaches using the frequency of an echo signal for distinguishing true echoes, Leszczynski does not teach or suggests extracting a portion of a signal that reflects a specific frequency component that is maintained for a predetermined period.

In summary, neither Hayashi nor Leszczynski teaches the claimed feature of “an ultrasonic signal having a specific frequency component maintained for a predetermined period.” Accordingly, the references fail to teach “transmitting an ultrasonic signal having a specific frequency component maintained for a predetermined period” and “extracting a portion of the converted digital signal that reflects the specific frequency component maintained for the predetermined period.” Further, to the best knowledge of Applicant, there is no additional prior art to remedy the deficiencies of these references. Therefore, the references in combination or alone have not established *prima facie* obviousness.

The Examiner's Obviousness Rationale Is Impermissible Hindsight

*A conclusion of obviousness using hindsight reasoning is impermissible when the reasoning uses knowledge gleaned only from applicant's own disclosure.* The M.P.E.P. states at Section 2145 X.A. (Impermissible Hindsight) that "[a]ny judgment on obviousness is in a sense necessarily a reconstruction based on hindsight reasoning, but so long as it takes into account only knowledge which was within the level of ordinary skill in the art at the time the claimed invention was made and does not include knowledge gleaned only from applicant's disclosure, such a reconstruction is proper." *In re McLaughlin* 443 F.2d 1392, 1395, 170 USPQ 209, 212 (CCPA 1971)."

As discussed above, neither Hayashi nor Leszcynski teaches "an ultrasonic signal having a specific frequency component maintained for a predetermined period." This feature is not, or is not proven to be, part of knowledge within the level of ordinary skill in the art at the time the claimed invention was made. *The Office Action uses Applicant's own disclosure of this feature as if Hayashi or Leszcynski discloses this feature.* Because *the Office Action rejects Claim 1 as obvious using the knowledge gleaned only from Applicant's own disclosure*, the rejection is a result of *impermissible hindsight*. For this reason, Claim 1 is patentable over Hayashi and Leszcynski.

Claims 5 and 10-14 depending from Claim 1 are also patentable over the references for at least the same reasons in addition to reciting further distinguishing features and particular combinations.

Claim 6

Claim 6 recites, among other features, that "determining the first arrival time of the ultrasonic signal received by the first receiver comprises: amplifying the received ultrasonic signal to generate an amplified signal; filtering the amplified signal to generate a filtered signal in which an unnecessary frequency of the amplified signal is removed or weakened; converting the filtered signal into a digital signal; extracting a portion of the converted digital signal, the extracted portion reflecting the specific frequency component maintained for the predetermined period; and analyzing the extracted portion to determine the first arrival time."

As discussed above with respect to Claim 1, neither Hayashi nor Leszcynski teaches "extracting a portion of the converted digital signal that reflects the specific frequency

component maintained for the predetermined period.” Further, to the best knowledge of Applicant, there is no additional prior art to remedy the deficiencies of Hayashi and Leszcynski. Further, the obviousness rejection of Claim 6 uses the *knowledge gleaned only from Applicant’s own disclosure*, and therefore the rejection is a result of *impermissible hindsight*.

In view of the foregoing, Claim 6 and its dependent claims are patentable over Hayashi and Leszcynski. Reconsideration of the rejection is respectfully requested.

#### Claims 7 and 8

Claim 7 recites, among other features, “a transmitter configured to generate and transmit an ultrasonic signal having a specific frequency component maintained for a predetermined period” and “a digital signal processor configured to process the digital data stored in the memory to extract a portion reflecting the specific frequency component maintained for the predetermined period.”

As discussed above with respect to Claim 1, neither Hayashi nor Leszcynski teaches “transmitting an ultrasonic signal having a specific frequency component maintained for a predetermined period” and “extracting a portion of the converted digital signal that reflects the specific frequency component maintained for the predetermined period.” Further, to the best knowledge of Applicant, there is no additional prior art to remedy the deficiencies of Hayashi and Leszcynski. Further, the obviousness rejection of Claim 7 uses the *knowledge gleaned only from Applicant’s own disclosure*, and therefore the rejection is a result of *impermissible hindsight*.

In view of the foregoing, Claim 7 and its dependent claim, Claim 8, are patentable over Hayashi and Leszcynski. Reconsideration of the rejection is respectfully requested.

#### Dependent Claims

Although Applicant has not addressed all the issues of the dependent claims, Applicant respectfully submits that Applicant does not necessarily agree with the characterization and assessments of the dependent claims made by the Examiner, and Applicant believes that each claim is patentable on its own merits. Applicant respectfully submits that pursuant to 35 U.S.C. § 112, ¶4, the dependent claims incorporate by reference all the limitations of the claim to which they refer and include their own patentable features, and are therefore in condition for allowance.

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Therefore, Applicant respectfully requests the withdrawal of all claim rejections and prompts allowance of the claims.

### **New Claim**

New Claim 15 recites, among other features, “*processing the received signal to locate a signal portion representing a span of the specific frequency for the predetermined period.*” Neither Hayashi nor Leszcynski teaches this feature. Further, to the best knowledge of Applicant, there is no additional reference or non-reference prior art to remedy the deficiencies of Hayashi and Leszcynski. Therefore, Claim 15 is patentable over the prior art.

### **No Disclaimers or Disavowals**

Although the present communication may include alterations to the application or claims, or characterizations of claim scope or referenced art, Applicant is not conceding in this application that previously pending claims are not patentable over the cited references. Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. Applicant reserves the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent, child or related prosecution history shall not reasonably infer that Applicant has made any disclaimers or disavowals of any subject matter supported by the present application.

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### **CONCLUSION**

Applicant has endeavored to address all of the Examiner's concerns as expressed in the outstanding Office Action. Accordingly, arguments in support of the patentability of the pending claim set are presented above. In light of the above remarks, reconsideration and withdrawal of the outstanding rejections is respectfully requested. If the Examiner has any questions which may be answered by telephone, he is invited to call the undersigned directly.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

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